

Guest Editorial

FOR MANY years now, data networking technologies have been widely applied in the control of industrial and military applications. These applications include manufacturing plants, automobiles, and aircraft. Connecting the control system components in these applications, such as sensors, controllers, and actuators, via a network can effectively reduce the complexity of the systems with nominal economical investments. Furthermore, the applications connected through a network can be remotely controlled from a long-distance source. Traditionally, the networks used in the aforementioned applications are specific industrial networks, such as controller area networks (CAN) and PROFIBUS. Recently, general data networks such as Ethernet and Internet are rapidly advancing to be the networks of choice for many applications due to their flexibility and lower costs.

Distributed network-based control systems are becoming a major trend in industrial electronics control applications and have received much deserved attention in recent years. Using distributed network-based control systems has many advantages over conventional control techniques, such as networking capability, modularity, wiring savings, and self-configuration. Distributed network-based control systems allow us to do distributed control and computing, tele-robotics, cost-effective factory automation, and many other critical applications.

Researchers from different countries around the world have been devoting a significant amount of their time and energy to achieve better distributed network-based control systems schemes and applications. This "Special Section on Distributed Network-Based Control Systems and Applications" of the

IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS includes 14 papers from experts in the area of distributed network-based control systems from four different continents (three from the U.S., two from Greece, two from Japan, two from Spain, one from Austria, one from Italy, one from Korea, one from New Zealand, and one from the U.K.). The papers in this Special Section cover a wide variety of distributed network-based control systems, from Internet to PROFIBUS network-based control, from robot to battery-energy control, from manufacturing plant to power-plant applications, from network induced time-delay compensation to protocol design issues.

I hope that this Special Section can stimulate some of our readers' interest in this increasingly important and rewarding distributed network-based control systems area, as well as provide a reference for readers who are involved in this field. Certainly, there are many other experts in the area of distributed network-based control systems but their papers could not be included in this Special Section due to page limitations. Interested readers can start with this Special Section to find out related literature by following the references cited by each paper in this Special Section.

I would like to thank all of the authors, Associate Editors, and Reviewers of this Special Section for their hard work, and for the help and patience of Prof. M. P. Kazmierkowski (current Editor-in-Chief) and Prof. F. Harashima (former Editor-in-Chief) of the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS to make this important Special Section a success.

MO-YUEN CHOW, *Guest Editor*
Department of Electrical and Computer Engineering
North Carolina State University
Raleigh, NC 27695 USA

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Mo-Yuen Chow (S'81–M'82–SM'93) received the B.S. degree in electrical and computer engineering from the University of Wisconsin, Madison, in 1982, and the M.Eng. and Ph.D. degrees from Cornell University, Ithaca, NY, in 1983 and 1987, respectively.

Upon completion of the Ph.D. degree, he joined the Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, as an Assistant Professor. He became an Associate Professor in 1993 and a Professor in 1999. He was a Senior Research Scientist with the U.S. Army TACOM TARDEC Division during the summer of 2003. He spent his sabbatical leave in 1995 as a Visiting Scientist in the ABB Automated Distribution Division. He has also been a consultant to Duke Power Company, Otis Elevator Company, Taiwan Power Company, J. W. Harley Company and a faculty intern at Duke Power Company. His core technology is diagnosis and control, artificial neural networks, and fuzzy logic. Since 1987, he has been applying his core technology to areas including motor systems, power distribution systems, network-based distributed control systems, and unmanned vehicles. He has served as a Principal Investigator

in several projects supported by the National Science Foundation, Center for Advanced Computing and Communication, Nortel Company, Electric Power Research Institute, Duke Power Company, ABB Company, Electric Power Research Center, NASA, and the U.S. Army. He established the Advanced Diagnosis and Control (ADAC) Laboratory at North Carolina State University. He has authored one book, several book chapters, and over 100 journal and conference articles related to his research work.

Prof. Chow is an Associate Editor of the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS and an AdCom Member of the IEEE Industrial Electronics Society (IES). He served as the IES Vice President of Member Activities during 2000–2001.